

MIOSKOWSKI ET AL.  
Appl. No. 10/553,260  
Atty. Ref.: 1721-100  
Amendment  
April 4, 2008

**AMENDMENTS TO THE CLAIMS:**

Please amend the claims as follows:

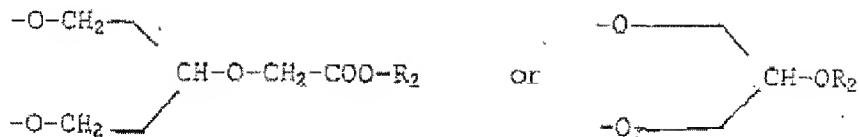
1. (Currently Amended) A [[novel]] structure [[with]]comprising macromolecules self-organized around nanotubes, characterized in that wherein said structure is they are essentially formed from rings of polymerized lipid compounds surrounding the nanotubes, [[these]] the polymerized lipid compounds comprising one chain, A, or two A chains, said one chain A or two A chains being obtained from lipid compounds comprising one or two chains A-linked to a group Z, said polymerized lipid compounds having the structure A-Z-A or A-Z,

wherein:

- A represents a representing a  $\text{CH}_3-(\text{CH}_2)_m-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-(\text{CH}_2)_n-$  chain, wherein n and m, which are the same or different, are [[being]] integers from 1 to 16; and

- Z represents a representing a polar head formed by a -COOH, -CO-NH-Y, -NH<sub>2</sub> or N<sup>+</sup>(R)<sub>3</sub> group, R being a C<sub>1</sub> to C<sub>4</sub> alkyl and Y being a -(CH<sub>2</sub>)<sub>4</sub>-C(R<sub>1</sub>)-N(CH<sub>2</sub>-COOH)<sub>2</sub> radical,

provided that if said polymerized lipid compounds contain one chain, A, then [[with]] R<sub>1</sub> represents representing H or a COOH radical, and [[if]] A further represents a single lipid chain, or a group of the following structure:

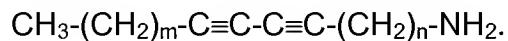


where R<sub>2</sub> represents a -COOH or -CO-NH-Y<sub>1</sub> group, Y<sub>1</sub> being a -(CH<sub>2</sub>)<sub>4</sub>-C(R<sub>3</sub>)-N(CH<sub>2</sub>-COOH)<sub>2</sub> radical and where R<sub>3</sub> represents H or a COOH radical;

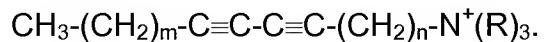
or Z or R<sub>2</sub> may also be hydrophilic or neutral polar heads ~~of the sugar or polysaccharide type.~~

~~or Z or R<sub>2</sub> may also be hydrophilic or neutral polar heads, of the sugar or polysaccharide type.~~

2. (Currently Amended) The structure[[s]] as claimed in claim 1, characterized in that the lipid compounds to be polymerized are amine lipids of formula:



3. (Currently Amended) The structure[[s]] as claimed in claim 1, wherein characterized in that the lipid compounds to be polymerized are quaternary ammoniums of formula:



4. (Currently Amended) The structure[[s]] as claimed in claim 1, wherein

~~characterized in that~~ the lipid compounds to be polymerized are acid lipids with two chains A attached to Z.

5. (Currently Amended) The structure[[s]] as claimed in claim 2, wherein ~~characterized in that~~ the lipid compounds to be polymerized are functionalized by a chelating group.

6. (Currently Amended) The structure[[s]] as claimed in claim 1, wherein ~~characterized in that~~ the lipid compounds to be polymerized are functionalized by a neutral hydrophilic head ~~of the sugar or polysaccharide type~~.

7. (Currently Amended) A method of obtaining the structure[[s]] as claimed in claim 1, comprising ~~characterized in that it comprises the steps consisting in:~~

- bringing the raw nanotubes into contact with a solution of lipids so as to form a stable suspension;
- polymerizing the lipids, which are self-organized around the nanotubes; and
- recovering the nanotubes coated with rings formed by the polymerized lipids.

8. (Currently Amended) The method as claimed in claim 7, wherein ~~characterized in that~~ the raw nanotubes are sonicated in a lipid solution in a buffered aqueous medium advantageously containing a detergent, the latter being subsequently removed by dialysis, and then the suspension of nanotubes in the aqueous buffer is subjected to a treatment for polymerizing the lipids.

9. (Currently Amended) A method of purifying nanotubes, wherein characterized ~~in that~~ the structure[[s]] as claimed in claim 1 are subjected to a treatment so as to remove the rings of polymerized lipid compounds around the nanotubes.

10. (Currently Amended) The method as claimed in claim 9, wherein characterized ~~in that~~ said structure[[s are]] is subjected to size exclusion chromatography.

11. (Currently Amended) The method as claimed in claim 9, wherein characterized ~~in that~~ an electric field is applied in order to remove the rings.

12. (Currently Amended) The method as claimed in claim 9, wherein characterized ~~in that~~ said structure[[s are]]is heated in a Tris buffer at a temperature above 90°C for about 14 hours in order to remove the polymer and obtain ~~restore~~ the stripped nanotubes.

13. (Currently Amended) A method for obtaining nanotubes protected by a polymer coating, said method comprising treating nanotubes according to the method of claim 8 and, optionally, Application of the structures as claimed in claim 1 for protecting the nanotubes and, if required, for shortening [[these]]the nanotubes thus obtained through a chemical fragmentation processin a controlled manner.

14. (Currently Amended) A method for obtaining vectors for hydrophobic molecules or membrane proteins, comprising:

stripping off the nanotubes structures according to claim 1 and purifying the nanotubes obtained according to the method of claim 9, 10 or 11 to solubilize

MIOSKOWSKI ET AL.  
Appl. No. 10/553,260  
Atty. Ref.: 1721-100  
Amendment  
April 4, 2008

hydrophobic molecules,

sonicating the hydrophobic molecules in the presence of said structures, or  
solubilising membrane proteins that are purified in the presence of detergents,  
removing the detergent dialysis

~~Application of the structures as claimed in claim 1 as vectors for hydrophobic molecules or membrane proteins.~~

15. (Currently Amended) A method for obtaining molecular motors, comprising  
decorating a structure according to claim 1 with cellular motor proteins ~~Application of the~~  
~~structures as claimed in claim 1 as molecular motors.~~

16. (Currently Amended) A method for the vectorization of products,  
comprising:

stripping off the nanotubes structures according to claim 1 and purifying the  
nanotubes obtained according to the method of claim 9, 10 or 11 to solubilise  
hydrophobic molecules,

solubilising hydrophobic molecules according the method of claim 14 to obtain  
complexes useful as vectors

~~Application of the structures as claimed in claim 1 to the vectorization of~~  
~~products, especially in the pharmaceutical or cosmetic or perfumery field.~~

17. (new) The structure as claimed in claim 6, wherein the neutral hydrophilic head is a sugar or polysaccharide.